Embedded TCP Agents for Near-Earth Communications, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

Architecture Technology Corporation (ATC) will design, model, implement, and demonstrate extensible, embedded agents that will continuously adapt the behavior of the Internet-standard Transmission Control Protocol (TCP) to the unique requirements of near-Earth space communications. These embedded agents will enable TCP to adapt its behavior based on exogenous information, such as satellite ephemeris and ground station locations, or the current characteristics of the communications path as determined by lower-level protocols or periodic end-to-end tests. By extending the transport protocol, this approach will improve near-Earth communications for all higher-level protocols that use TCP, such as FTP or HTTP, and will eliminate the need to modify these applications for space communications. Initially, embedded TCP agents will enable TCP to maintain sessions, transparently to applications, across temporary losses of communications, such as when a satellite passes between ground stations. Embedded agents can easily be extended to mitigate other effects of near-Earth communications, such as variable latencies or bit error rates. While TCP has been widely researched, modeled, and extended, embedded TCP agents are unique in providing an extensible, production-quality platform for quickly integrating cutting-edge research results into products that will support the unique needs of near-Earth space communications and other demanding communications environments.

Primary U.S. Work Locations and Key Partners

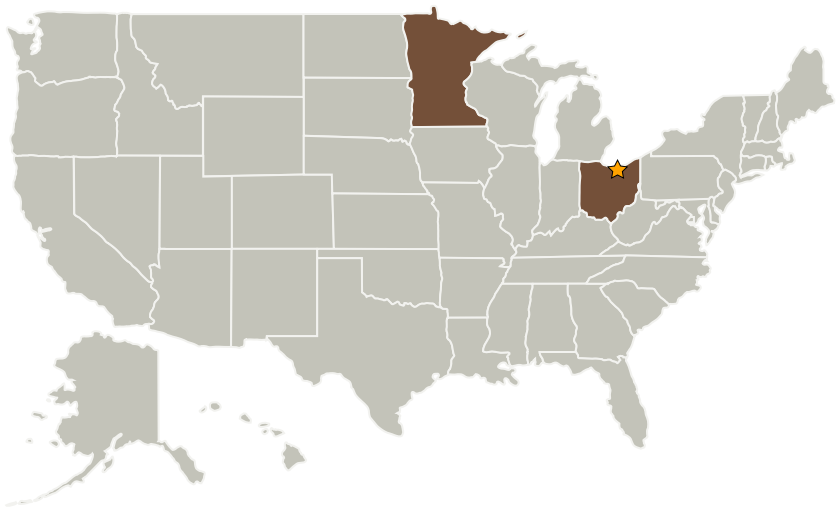

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Architecture Technology Corporation	Supporting Organization	Industry	Eden Prairie, Minnesota

Primary U.S. Work Locations	
Minnesota	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Timothy J Salo

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.5 Revolutionary Communications Technologies
    - TX05.5.2 Quantum Communications